

FACT SHEET FOR NPDES PERMIT WA-000150-3

SEATTLE STEAM COMPANY

This fact sheet is a companion document to the draft National Discharge Elimination System (NPDES) Permit No. WA-000150-3. The Department of Ecology (the Department) is proposing to issue this permit, which will allow discharge of wastewater to waters of the state of Washington.

This fact sheet explains the nature of the proposed discharge, the Department's decisions on limiting the pollutants in the wastewater, and the regulatory and technical basis for those decisions. Public involvement information is contained in Appendix A. Definitions are included in Appendix B.

GENERAL INFORMATION

Applicant:	Seattle Steam Company
Facility Address:	1319 Western Avenue Seattle, Washington 98101 King County
Type of Facility:	Steam Heat Utility
Discharge Location:	Elliott Bay Latitude: 47° 36' 23" N Longitude: 122° 20' 10" W
Water Body ID Number:	WA-09-0010

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BACKGROUND INFORMATION

DESCRIPTION OF THE RECEIVING WATER

The applicable receiving water standards for surface water are those adopted by the Department of Ecology (the Department) and approved by the EPA Regional Administration pursuant to Section 303 of the Federal Water Pollution Control Act amendments. Elliott Bay is designated "Class A" marine water under Chapter 173-201A WAC, water quality standards of the state of Washington. Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Elliott Bay is identified on the 305(B) report as a "water quality limited water body" due to fecal coliform levels. Elliott Bay is also included on the EPA's 304(l) "mini list" for violation of narrative water quality criteria for numerous toxics. This listing was based on high mortalities found in sediment bioassays, evidence of bioaccumulation, and levels of toxics in sediments. The nature of the discharge from the Seattle Steam Company does not contribute to the identified problems in Elliott Bay.

DESCRIPTION OF THE FACILITY

Industrial Process

The physical plant has been operating as a commercial steam heat and power generating facility since the 1890's. Seattle Steam Company has been operating the plant since 1972 and continues to produce pressurized steam for space heating purposes in downtown Seattle. The plant employs 15 people and operates on a 24-hour, year-round basis.

The facility operates three boilers which are primarily fired using natural gas while bunker fuel oil can be used as a backup. Steam production typically varies with the season as production increases in the winter months to over 400,000 pounds per hour.

The steam distribution system consists of 18 miles of underground pipelines. As operated by the Permittee, the plant provides no means for returning condensate to the boiler plant and is therefore classified as a 100% feedwater make-up operation.

The plant uses raw water supplied from the City of Seattle to generate steam. Boiled feed water must be conditioned through a four-step process before it can be introduced into the boilers.

Raw city water enters at 20 to 25 parts per million (ppm) total calcium (Ca) and magnesium (Mg) hardness. It is first introduced onto a sodium zeolite ion exchanger which transfers calcium and magnesium hardness ions to the zeolite medium and releases non-scale forming sodium (Na) ions. When the zeolite bed is exhausted, calcium and magnesium chlorides are backwashed to waste as the zeolite is regenerated with sodium chloride. This delivers softened cold water with 0 to 1 ppm hardness to the Deaerating (DA) Feedwater Heater.

The DA heater is a direct contact type water heater which heats feedwater to 220° F and in the process removes oxygen and other undissolved gases. Hot feedwater is then delivered to the feedwater supply system where treatment chemicals are added in proportion to flow, to further reduce the negative effects of hardness ions and to purge any trace of oxygen before entering the boilers.

Oxides of silica and iron are removed in the pretreatment process through a closely monitored continuous blowdown system. The blowdown rate is generally maintained at 3 to 4% of flow.

The final step in the process is to add a filming amine to the generated steam to prevent corrosion in the steam condensate system.

Wastewater Discharge

Presently, the only process wastewater discharged to Elliott Bay is the ion exchange backwash. This wastewater has not been heated. Elevated concentrations of sodium, calcium, magnesium, and chloride may be expected in the wastewater. Due to valve leakage, some untreated city water is also discharged. The continuous boiler blowdown wastewater was previously discharged directly to the bay and this may have been responsible for pH violations in the past. The blowdown was redirected to the Metro sanitary sewer in 1988.

The NPDES permit will only address the ion exchanger (or zeolite), regenerate wastewater, and storm water. The ion regenerate wastewater is essentially city water with a higher concentration of hardness and chloride ions. These constituents are not expected to have any measurable effect in the marine receiving water environment.

The wastewater is discharged through a dedicated outfall into Elliott Bay under Pier 57. An oil boom is in place in the discharge area in the bay.

PREVIOUS PERMIT LIMITATIONS

The previous permit for this facility was issued on July 1, 1999. The previous permit placed effluent limitations on flow, temperature, pH, and oil & grease as follows:

Parameter	Daily Maximum	Sampling Frequency
Flow (gpd)	45,000	Weekly
Temperature (C°)	16	Weekly
pH (standard units)	6 to 9	Monthly
Oil and Grease (mg/L)	15	Semi-annually

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

Review of Discharge Monitoring Reports (DMRs) submitted over the last permit cycle revealed general compliance with all parameters.

The facility last received an inspection on January 28, 2004. The inspection revealed operations at the site to be consistent with good pollution prevention practices.

A priority pollutant scan conducted in March of 1989 showed no parameters above water quality standards. However, acetone, chloroform, and bromodichloromethane were found above the method detection limits at 5, 15 and 1.5 parts per billion, respectively. The presence of these parameters may be linked to sewage leakage from a nearby Metro line. Prior to November of 1989, the discharge sump at the facility was unlined. Since the last priority pollutant scan was conducted in March of 1989 (14 years ago), this renewed permit will require a priority pollutant scan to be conducted.

WASTEWATER CHARACTERIZATION

An application for permit renewal was submitted to the Department on December 11, 2003. As reported in the permit application, the proposed wastewater discharge is characterized for the following regulated parameters:

Parameter	Reported Values
Oil and Grease	10 mg/L
pH	6 to 9 standard units
Temperature	
Winter	50° F (10° C)
Summer	70° F (21° C)
Flow	45,000 gpd

PROPOSED PERMIT LIMITATIONS AND CONDITIONS

Federal and state regulations require that effluent limitations set forth in an NPDES permit must be either technology- or water quality-based. Technology-based limitations are based upon the treatment methods available to treat specific wastewater. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR and Chapter 173-220 WAC). Water quality-based limitations are based upon compliance with the water quality standards (Chapter 173-201A WAC). The more stringent of these two limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Technology effluent limitations are set by regulation in the federal effluent guidelines or on a case-by-case basis using Best Professional Judgment (BPJ) when no effluent guidelines exist for an industrial category. Technology-based limits represent the best treatment a facility can achieve consistent with the economic means of the industry as a whole (in the case of effluent guidelines) or of the specific facility being permitted (in the case of BPJ). Technology-based effluent limits are process control parameters or numbers, which indicate that a process (which in this case is wastewater treatment) is not functioning properly.

The technology-based limit for oil & grease is 10 mg/L in the proposed permit, the same as in the previous permit. The facility has demonstrated the ability to meet this limit, which is based on the proven performance of gravity oil/water separators.

The flow limitation is changed from 45,000 gpd to 50,000 gpd in this permit as requested by the facility. The highest reported value for flow during the last permit cycle was 42,900 gpd for the month of December 2000. The facility may expect a production increase in the near future.

WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established water quality standards. The Washington State water quality standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the waters of the state.

During months of May through October, the temperature of the effluent, as measured inside the Seattle Steam plant, often does not meet water quality standards. A mixing zone has been applied in this permit to the receiving water in accordance with Chapter 173-201A WAC. The Permittee is required to monitor background temperature in Elliott Bay to determine compliance. The temperature limit on the proposed permit is 16.0° C at the edge of the defined mixing zone. When background conditions exceed 16.0° C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C. The maximum boundary of the mixing zone shall be no greater than 200 feet from the discharge point in Elliott Bay.

Footnote 1 of Special Condition S2 of the permit allows the monitoring frequency for temperature to be reduced from weekly to monthly if the facility demonstrated one year compliance. According to the temperature data submitted during the last permit cycle, the facility has demonstrated compliance with the temperature limit at the edge of the mixing zone. Thus, the Department proposes to set monthly monitoring for temperature in this permit.

If the water quality-based criterion for a parameter is more stringent than the technology-based limit for that parameter, the Department must employ the more stringent of these two limits for the parameter of concern. The pH limit in the previous permit was a technology-based limit (6 to 9 standard units). The water quality criteria for pH in a Class "A" marine water environment (Elliott Bay) are between 7 and 8.5 standard units. The water quality criteria for pH are more stringent, and the effluent limit for pH in this permit will be set at 7 to 8.5 standard units. If the Permittee conducts a pH buffering capacity study (mixing zone study), and demonstrates there is adequate buffering capacity to ensure compliance with the technology-based limits for pH of 6 to 9 standard units at the point of discharge will assure compliance with the water quality standards, the Department will consider employing the technology-based limit for pH in the permit.

Whole Effluent Toxicity

In addition to the requirement not to exceed specific chemical parameters, the water quality standards require that the effluent not cause toxic effects in the receiving waters.

Unidentified sources of toxicity are not expected to be present in the effluent from this discharge. No whole effluent toxicity testing is required in this permit.

Human Health

The conditions in this permit seek to protect aquatic life from toxic effects. It is assumed that protecting aquatic life will also protect the health of humans. If Ecology finds that this permit does not protect human health, the permit will be modified to incorporate new conditions as needed.

Sediment Quality

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400). The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no potential for the discharge of substances that may cause a violation of the sediment management standards.

Ground Water Quality

The Department has promulgated ground water quality standards (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This discharger has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE PREVIOUS PERMIT

Parameter/Outfall	Proposed Effluent Limitations	Previous Effluent Limitations
Flow (gpd)	50,000	45,000
Temperature (°C)	16.01	16.01
pH (standard units)	7.0 to 8.5	6.0 to 9.0
Oil and Grease (mg/L)	10	10

¹ Temperature shall be monitored at the mixing zone boundary, no greater than 200 horizontal feet from the point of discharge into Elliott Bay.

The proposed effluent limitations in this permit are the same as those in the previous permit.

MONITORING AND REPORTING

Effluent monitoring, recording, and reporting are required (WAC 173-220-210) to verify the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring and testing schedule is detailed in the permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

OTHER PERMIT CONDITIONS

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department may require the Permittee to develop best management plans to prevent this accidental release under authority of 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

Seattle Steam stores bunker fuel number 6 on-site for backup fuel needs. The fuel is stored in two tanks sized 3,000 and 6,000 barrels. Both tanks are constructed of steel and placed in double-walled concrete vessels. A spill detection and prevention sump is hydraulically connected to the space between the steel and concrete walls.

The Permittee has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The permit requires the Permittee to update this plan.

SOLID WASTE PLAN

The Department has determined that the Permittee has a potential to cause pollution of the waters of the state from leachate of solid waste.

This permit requires, under the authority of 90.48.080, that the Permittee update the solid waste plan designed to prevent solid waste from causing pollution of the waters of the state. The updated plan must be submitted to the local permitting agency for approval, if necessary, and to the Department.

STORMWATER POLLUTION PREVENTION PLAN

This permit requires the Permittee to implement all best management practices (BMPs) as identified in the developed Stormwater Pollution Prevention Plan. Any changes made to reduce, eliminate, and prevent the pollution of stormwater on-site, shall be updated on the Stormwater Pollution Prevention Plan.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all NPDES permits issued by the Department.

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary, to meet water quality standards, sediment quality standards, ground water standards, or human health criteria based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

REVIEW BY THE PERMITTEE

A proposed permit was reviewed by the Permittee for verification of facts. Only factual items were corrected in the draft permit.

APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed above. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public Notice of Application (PNOA) was published on January 23 and 30, 2004, in the *Seattle Times* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on May 14, 2004, in the *Seattle Times* to inform the public that the draft permit and fact sheet were available for review. Interested persons were invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents were available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments were mailed to:

Water Quality Permit Coordinator
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30)-day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (425) 649-7201, or by writing to the address listed above.

APPENDIX B—DEFINITIONS

Ambient Water Quality—The existing environmental condition of the water in a receiving water body.

BOD₅—Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Critical Condition—The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

National Pollutant Discharge Elimination System (NPDES)—The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/state permits issued under both state and federal laws.

pH—The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Technology-based Effluent Limit—A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)—Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Water Quality-based Effluent Limit—A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C—SITE MAP

